

Claims:

1. A method for controlling operation of an assisted ventilation device supplying pressurised gas to a patient, the method comprising the steps of:
5 determining a (relatively longterm average) of pressure of gas supplied to said patient; and
controlling the pressure supplied by said ventilation device with regard to said longterm average.
- 10 2. A method for detecting the occurrence of a potential or actual overpressure during assisted ventilation, comprising the steps of:
determining a (relatively longterm average) of ventilation pressure; and
determining whether the average approaches or exceeds a threshold value as being indicative of a potential or actual overpressure occurring.
- 15 3. A method as claimed in claim 2, comprising the further step of issuing an alarm upon the determination of a potential or actual overpressure occurring.
- 20 4. A method for controlling operation of an assisted ventilation device supplying pressurised gas to a patient, the method comprising the steps of:
measuring the currently delivered pressure;
determining a (relatively longterm average) of the measured pressure;
comparing said average against a threshold value; and
25 if the threshold value is approached or exceeded, controlling the pressure supplied by the device.
5. A method as claimed in claim 4, wherein said controlling step includes limiting or reducing supplied gas pressure to the patient.
- 30 6. A method as claimed in claim 5, wherein, for the case of reducing supplied gas pressure, the reducing step is a non-linear function of time and/or pressure.
- 35 7. A method as claimed in claim 6, wherein the degree of reduction is greater as said threshold value is approached.

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8. A method as claimed in any one of claims 4 to 7, wherein, for the case of said longterm average exceeding said threshold, said determining step includes a condition that said excess must occur for a minimum period of time before it is determined that a potential or actual overpressure is occurring.

9. A method for controlling operation of an assisted ventilation device supplying pressurised gas to a patient, the method comprising the steps of:
determining a (relatively longterm average) of supplied pressure; and
10 controlling said supplied pressure as a function of a waveform template, a target patient ventilation and said longterm average.

10. A method as claimed in claim 9, wherein said function is given by:

$$15 \quad P = P_0 + k.A.f(v,t)$$

where:

P is said supplied pressure,

P_0 is a constant pressure,

K is a function of said longterm average,

20 A is a function of said target patient ventilation, and

$f(v,f)$ represents said waveform template.

11. A method as claimed in claim 9, wherein, in said controlling step, when said longterm average approaches a threshold value, strong control of said
25 supplied pressure is provided.

12. A method as claimed in any one of claims 4 to 11, wherein said longterm average is of the order of minutes.

30 13. A method as claimed in any one of claim 4 to 11, wherein said longterm average is taken over ten or more breaths.

14. Assisted ventilation apparatus for detecting a potential or actual overpressure condition, comprising:

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a blower to supply pressurised gas to a conduit, and in turn to a patient mask for connection with the entrance to a patient's airways:

a pressure sensor to detect the delivered pressure of gas in the conduit or at the mask, and provide a signal thereof; and

5 a controller receiving said pressure signal and having control over operation of the blower and operable to determine a (relatively longterm average) of the pressure signal and to control the supplied pressure with regard to said longterm average.

15 15. Assisted ventilation apparatus as claimed in claim 14, wherein said controller controls the supplied pressure as a function of a waveform template, a target patient ventilation and said longterm average.

16. Assisted ventilation apparatus for detecting a potential or actual overpressure condition, comprising:

15 a blower to supply pressurised gas to a conduit, and in turn to a patient mask for connection with the entrance to a patient's airways;

a pressure sensor to detect the delivered pressure of gas in the conduit or at the mask, and provide a signal thereof; and

20 a controller, receiving the pressure signal and having control over operation of the blower, and operable to determine a (relatively longterm average) of the pressure signal, compare the average against a threshold value, and if the threshold value is approached or exceeded, to control the blower and thus the supplied pressure.

25 17. Apparatus as claimed in claim 16, wherein said controller controls the supplied pressure by limitation or reduction.

18. Apparatus as claimed in claim 17, wherein, for the case of reducing supplied pressure, the controller reduces the pressure as a non-linear function of time and/or pressure.

30 19. Apparatus as claimed in claim 18, wherein the degree of reduction by the controller is greater as said threshold value is approached.

35 20. Apparatus as claimed in any one of claims 16 to 19, wherein, for the case of said longterm average exceeding said threshold, the controller operates subject

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to the condition that the time in excess must be greater than a minimum period of time before it is determined that a potential or actual overpressure is occurring.

21. Apparatus as claimed in any one of claims 16 to 20, further comprising alarm signalling means, coupled to said controller, for indicating that an alarm state exists if the threshold value is approached or exceeded.

22. Apparatus as claimed in any one of claims 14 to 21, wherein said controller determines the longterm average in the order of minutes.

23. Apparatus as claimed in any one of claims 14 to 21, wherein said controller determines the longterm average over ten or more breaths.

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09936854.010202

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU00/00411

A. CLASSIFICATION OF SUBJECT MATTERInt. Cl. ⁷: A61M 16/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A61M 16/-

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI: A61M 16/- & keywords

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 97/14462 A1 (UNIVERSITY OF FLORIDA) 24 April 1997	
A	EP 425092 A1 (RESPIRONICS INC.) 2 May 1991	
P, A	US 5901704 A (ESTES et. al.) 11 May 1999	

☐ Further documents are listed in the continuation of Box C
 ☒ See patent family annex

* Special categories of cited documents:

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"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

1 June 2000

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21 JUN 2000

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU00/00411

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search
Report

Patent Family Member

WO 9714462

AU 73686/96

EP 425092

AU 38508/93

CA 2024477

JP 7016517

US 5901704

AU 29268/92

EP 610405

WO 9308857

END OF ANNEX

09936854-010202